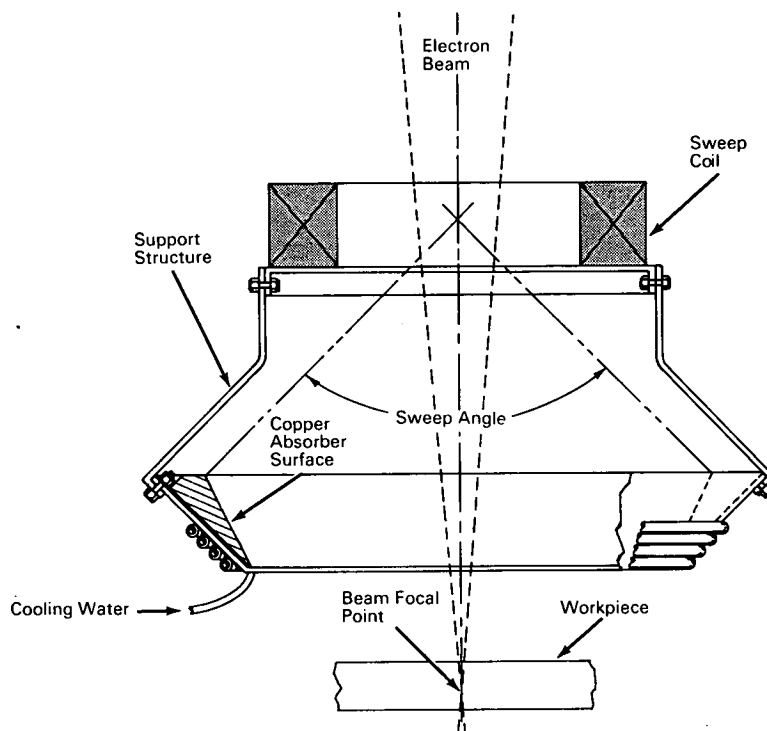


NASA TECH BRIEF



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Electron Beam Standby Absorber System



The problem:

While using a swept and scanned beam raster to locate position or measure characteristics of that beam, it is necessary to absorb the energy of the beam in places other than a workpiece which one intends to weld or otherwise process. It is desirable that this energy be absorbed by some means requiring no physical motion of either the absorber or the intended workpiece.

The solution:

Deflectors cause the electron beam to be distributed over an absorber located between the deflectors and the workpiece. A hole in the absorber permits the

undeflected beam to pass through the absorber when the deflection is deenergized. The beam passing through this hole, when the deflection is energized, is kept to a minimum power level by deflection rate change.

How it's done:

A water cooled standby absorber is interposed permanently between the deflection components and the beam workpiece. The energy of the beam is dissipated in the absorber. Along the electron beam axis, the time averaged energy density is much lower than at its focal point. This permits the absorption of the full beam power without harm to the absorber surface.

(continued overleaf)

The deflections of the beam at high speed and the distributive nature of the beam raster also aid greatly in making it possible to safely dissipate the beam power in the absorber.

The beam is kept in raster on this absorber during adjustments of the beam parameters. When one wishes to use the beam, the deflection is switched off, causing the beam to move to its undeflected position, passing through the hole in the absorber, to the workpiece. Switching off the beam is done by reversing this process.

Notes:

1. This system permits adjustment of electron beam systems during full power operating conditions.
2. Other configurations of this system are evident, such as off axis absorbers situated on one side of the beam.

3. A related system is described in NASA Tech Brief 67-10649. Inquiries may also be directed to:
Technology Utilization Officer
Marshall Space Flight Center
Huntsville, Alabama 35812
Reference: B67-10650

Patent status:

Inquiries about obtaining rights for the commercial use of this invention may be made to NASA, Code GP, Washington, D.C. 20546.

Source: R. D. Downing
of General Electric Company
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